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METHOD FOR CONSTRUCTING A DATA CONNECTION BETWEEN AN  
INTEGRATED HOUSEHOLD CONTROL SYSTEM AND A DATA TERMINAL,  
AND DATA TERMINAL FOR REMOTE CONTROL OF AN INTEGRATED  
HOUSEHOLD CONTROL SYSTEM

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Prior Art

The invention is based on the generic types defined by the preambles to independent claims 1 and 12.

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An integrated household control system combines technical functions and applications in the household. These include for instance security technology; controlling the heating, ventilation and air conditioning; controlling the lights and window shades; and load management. As household appliances and other technical equipment are integrated in the household, the integrated household control system undergoes progressive expansion. This includes controlling the stove, washing machine, shutters, and garage door; remote reading of the gas or water meter, for instance; and so forth. The integrated household control system is designed as a system that covers both equipment and applications and that integrates all the individual components and applications present in the house or apartment into one system. The data exchange between sensors, actuators and a central station is done over the so-called European Installation Bus (EIB) of the European Installation Bus Association (EIBA), of which the leading European electrical installation companies are members.

From the on-line edition of the daily newspaper

Die Welt (with a copyright note dated November 6, 1997),  
under the headline "Das Internet steuert den digitalen  
Herd" [The Internet Controls the Digital Stove], it has  
become known that inhabitants of a house can set up  
5 their own individual household program and manage it,  
guided by a dialogue, by typing on the screen using a  
so-called home assistant made up of a PC and software.  
Looking toward the 21st century, this raises the concept  
that a "stuck washing machine cycle" can easily be  
10 repaired by customer service on-line using a telephone  
network, or that the Sunday roast can be prepared fully  
automatically in the digital stove using recipe software  
from the internet.

The "Gira HomeServer" for the "Gira Instabus  
System" has been announced on the market. The  
"HomeServer" can be controlled in a house using a  
cordless phone. However, it can also be operated from  
outside, specifically from a mobile phone and/or  
worldwide from a PC using a modem.

With the "Easylon WebServer Software" from Gesytec  
GmbH, Aachen, Germany ([www.gesytec.de](http://www.gesytec.de)), it is possible  
to perform remote control, remote maintenance, remote  
display, and remote monitoring via the internet and the  
intranet.

25 According to the Handelsblatt [Commercial Gazette]  
of November 20, 1997, page 41, a motor vehicle is in  
development that has its own internet address -  
practically a rolling PC - in which the connection to  
the internet is done in one transmission direction  
30 ("downstream") via satellite, and in the other direction  
("upstream") via mobile radio. Satellite positioning

with a built-in GPS system is also contemplated.

According to Elektronik [Electronics] 22/1997,  
page 24, for the many applications both known and new in  
an automobile, the idea has also arisen in this  
5 connection of using only a single processor, instead of  
isolated applications on different platforms.

#### Advantages of the Invention

The subject of the application as defined by the  
characteristics of claim 1 and claim 12 has the  
10 following advantage:

With the method and the data terminal of the  
invention, an inhabitant of a house with household  
control technology is enabled to have household control  
functions tripped automatically as soon as he approaches  
the house. Especially if a motor vehicle-based computer  
that has an internet connection is provided with a  
navigation device or at least with a position  
determining device, the control software for the  
household control can be started automatically upon an  
20 approach to the house to be controlled.

This can be done in such a way that a web browser  
is automatically started with the household control home  
page. However, it can also be achieved by simple  
triggering using a telephone modem.

25 Advantageous refinements are defined by the  
dependent claims, the characteristics of which can also,  
where appropriate, be combined with one another.

Preferably, a PC (personal computer) with an internet connection, located in a motor vehicle, will be used to gain contact via the internet with the central station (control computer) of the household control, and thus to perform control operations in the house or to perform monitoring from the motor vehicle itself.

Examples of such control operations are controlling the garage door, turning on the heating, heating up a previously prepared meal, turning the lights on and off, and so forth.

Examples of monitoring operations are transmitting the alarm of an alarm system to the motor vehicle; the driver or passenger can then call the police, instead of entering the house. This enhances security in the event that an alarm has been triggered by a break-in.

Examples of status calls: Are the lights, stove and heating system turned off? Are the faucets off and windows and doors closed?

Operation of the intercom at the door.

Drawing

One exemplary embodiment of the invention is shown in the drawing and described in further detail below.

Fig. 1 schematically shows a block circuit diagram of a system that is suitable for performing the method of the invention; and

Fig. 2 is a flow chart.

Description of the Exemplary Embodiment

In Fig. 1, as a household control base, a house in which an integrated household control system 1 is located is shown. The integrated household control system essentially comprises a central entity (personal computer) 2 with a bus 3 (such as XT10 bus or an EIB), to which sensors and actuators, such as a garage door motor 4, are connected.

As the data terminal 11, a personal computer is located in a motor vehicle 10 and has a browser 12 and an initializing device 13 and a navigation device 15. The navigation device is provided with a position determining device 14.

Also connected to the data terminal 11 is a display 16 and a mobile radio module 17, by way of whose mobile interface 18 a connection can be made to a mobile radio network 100 (such as a GSM network).

The personal computer 11 furthermore, via a control unit 19, controls functions of the motor vehicle 10 (such as engine control, vehicle dynamics, and so forth).

To enable communication between the mobile data terminal 11 and the central station 2 of the integrated household control system 1, the central station 2 is connected to a telephone network 20, to which a telephone 6, for example, is also connected at the household control base. The connection between the central station 2 of the integrated household control system 1 and the telephone network 20 can be made for instance by means of a modem, or possibly also by means of a terminal adaptor or some other suitable device.

The telephone network 20 can be a mobile radio network (not shown) or a dedicated circuit network (as shown). The communication route between the interfaces 7 and 18 leads via an access node 21 for the internet, which is provided in the telephone network 20. Between this access node 21 and a node 22, the transmission of data takes place in the internet, or in other words in packet-oriented fashion, while a line-mediated transmission takes place in the dedicated circuit network 20. From the node 22, a connection leads to a base station 23 of the same mobile radio network that the mobile interface 18 is part of.

It is characteristic for the embodiment of the invention in accordance with the exemplary embodiment that the transmission of data (such as alarm data) from the integrated household control system 1 to the mobile data terminal 11 can possibly take place over the same lines and wireless connections as a dial-up connection, but some of the distance is overcome with a packet-oriented transmission method that follows the internet protocol, instead of using a line-conducted (exclusive) transmission method.

The connection thus made between the data terminal 11 in the motor vehicle 10 and the integrated household control system 1 can now be used to control household appliances from the motor vehicle, and in particular to turn them on or off. This requires merely that an internet connection with the central entity 2 of the integrated household control system 1, or with a specific household appliance, be made via the browser located on the mobile data terminal 11. The operation can be done via suitable home pages or other kinds of

human-machine interfaces.

In this way, the garage door can for instance be opened, or the heating system can be turned on. However, it is also possible to trip closed-loop control operations, such as lowering the temperature in the house in case one had forgotten to do so upon leaving the house. Finally, status calls are also possible, for instance for whether the shutters are in fact closed.

The packet-oriented method has some advantages that prove especially desirable in the motor vehicle: There are cost advantages, which are especially great if the dial-up nodes for both the central station 2 of the integrated household control system 1 and for the mobile data terminal 11 can be reached at local calling rates. Furthermore, because of the packet-oriented mode of transmission, more than one internet connection can be maintained via a single dial-up connection. This makes it possible on the one hand to maintain contact simultaneously with a plurality of integrated household control systems, or with a plurality of appliances within one integrated household control system, from the motor vehicle itself. However, it is also possible to maintain not only the active internet connection with the integrated household control system but a simultaneous active internet telephone connection.

Fig. 2 shows the sequence of an automated remote-control operation, in which the position determining device 14 shown in Fig. 1 trips the initializing device 13 as soon as the distance of the motor vehicle 10 from the household control base, as the vehicle returns home, has dropped to a limit value for instance of 500 meters.

First (block 30), the position determining device 14 reports the drop of the distance to the limit value of 500 meters.

5 This starts up the initializing device 13, and the personal computer of the mobile data terminal 11 with the aid of the browser 12 constructs a connection with the integrated household control system 1 and shows its home page on the display 16 (block 31).

10 The driver of the motor vehicle 10 thereupon selects the command "open the garage door" from a menu (block 32).

Corresponding remote control data are now transmitted by the internet protocol to the base station 23, the node 22, and the access node 21 via the GSM network, and finally to the modem 7 and the central entity 2 via the telephone network 20 (block 33).

In accordance with the remote control data received, the garage door is opened (block 34).

#### Possibilities for Modification

20 While in the example of Fig. 2 the impetus for the construction of the connection between the integrated household control system 1 and the mobile data terminal 11 comes from the data terminal, it is also possible, and specifically for data traffic that trips an alarm in  
25 the data terminal 11, for a data connection to be constructed from the integrated household control system, via the internet, unless a data connection that has been constructed in the opposite direction already



exists.

In a departure from Fig. 1, the position  
determining device 14 and/or the mobile radio modem 17  
each make joint use of at least one component of a  
mobile station of a mobile radio system.

The internet connection between the components 21  
and 22 can also be replaced by a dedicated circuit  
network and in particular a dedicated telephone circuit  
network connection, so that the dedicated telephone  
circuit network 20 extends as far as the base station  
23.

Finally, the invention is not limited to the  
capability of transmitting the data between the central  
station 2 and the data terminal 11 in one of the two  
directions by the internet protocol. On the contrary,  
line-mediated connections or mobile radio connections in  
one or both directions can be used.